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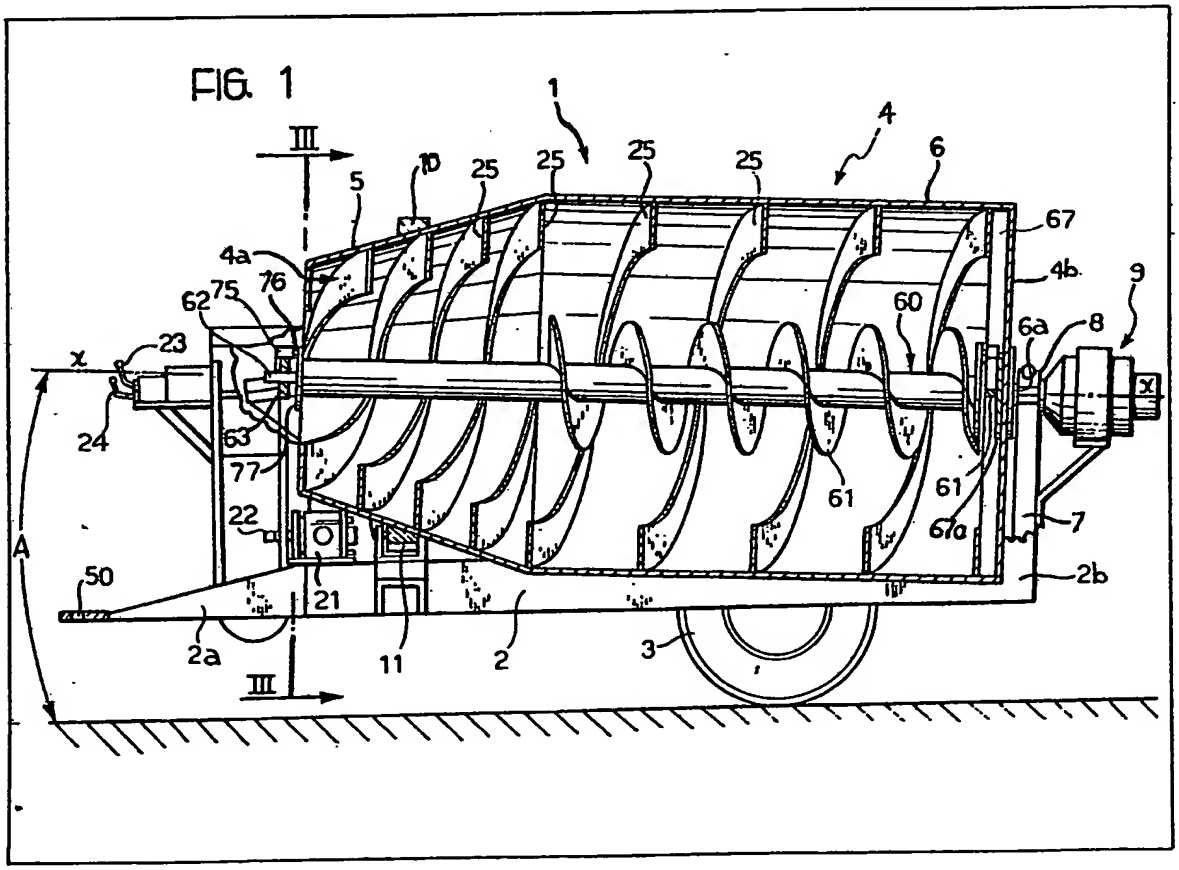
# (54) MACHINE FOR MIXING AND DISTRIBUTING LOOSE MATERIALS, SUCH AS ANIMAL FEEDSTUFFS

(57) A machine for mixing loose materials such as animal feedstuffs and distributing the mixed product comprises a rotary drum 4 open at one end 4a and mounted on a frame which can be self propelled or drawn as a trailer. The drum 4 is generally cylindrical, and is rotatable about an axis x inclined downwardly at a shallow angle from an open end 4a. Inwardly from the inside of the walls of the drum project helical mixing blades 25 and centrally through the drum extends a coaxial shaft 60 with a surrounding helical screw 61 which can be held fixed with respect to the frame as the drum rotates, to promote mixing, or allowed to rotate with the drum to promote discharge of mixed material from the drum. The materials to be mixed are fed to and discharged from the open end 4a by way of a screw conveyor 12, 18.

FIG. 1

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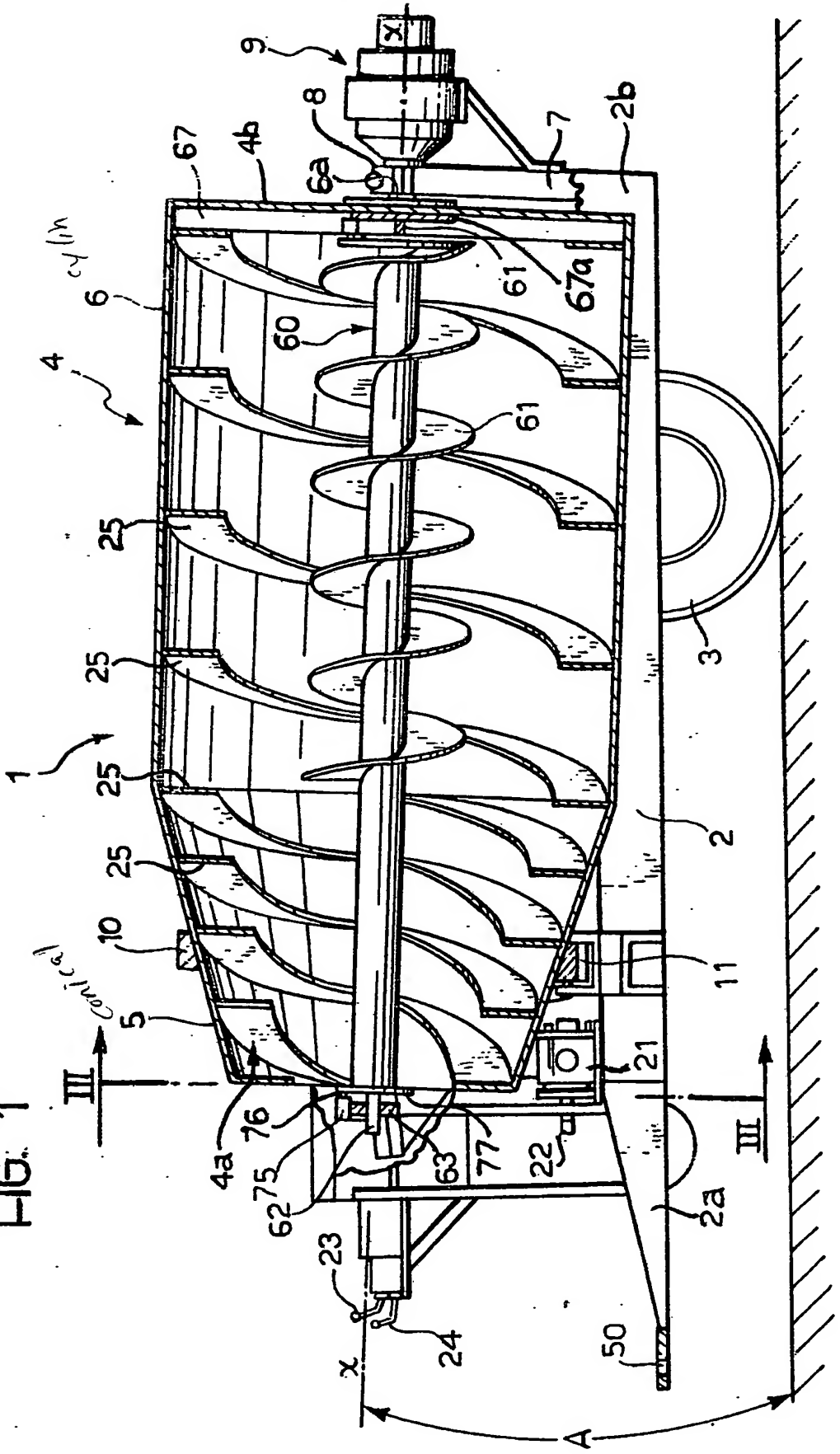
9
8
6a
7
2b
67
4b
61
67a
6
60
4
61
25
25
25
25
25
1
10
5
11
21
2
3
III
III
4a
76
75
62
63
77
22
2a
23
24
50
x
x
A

FIG. 1

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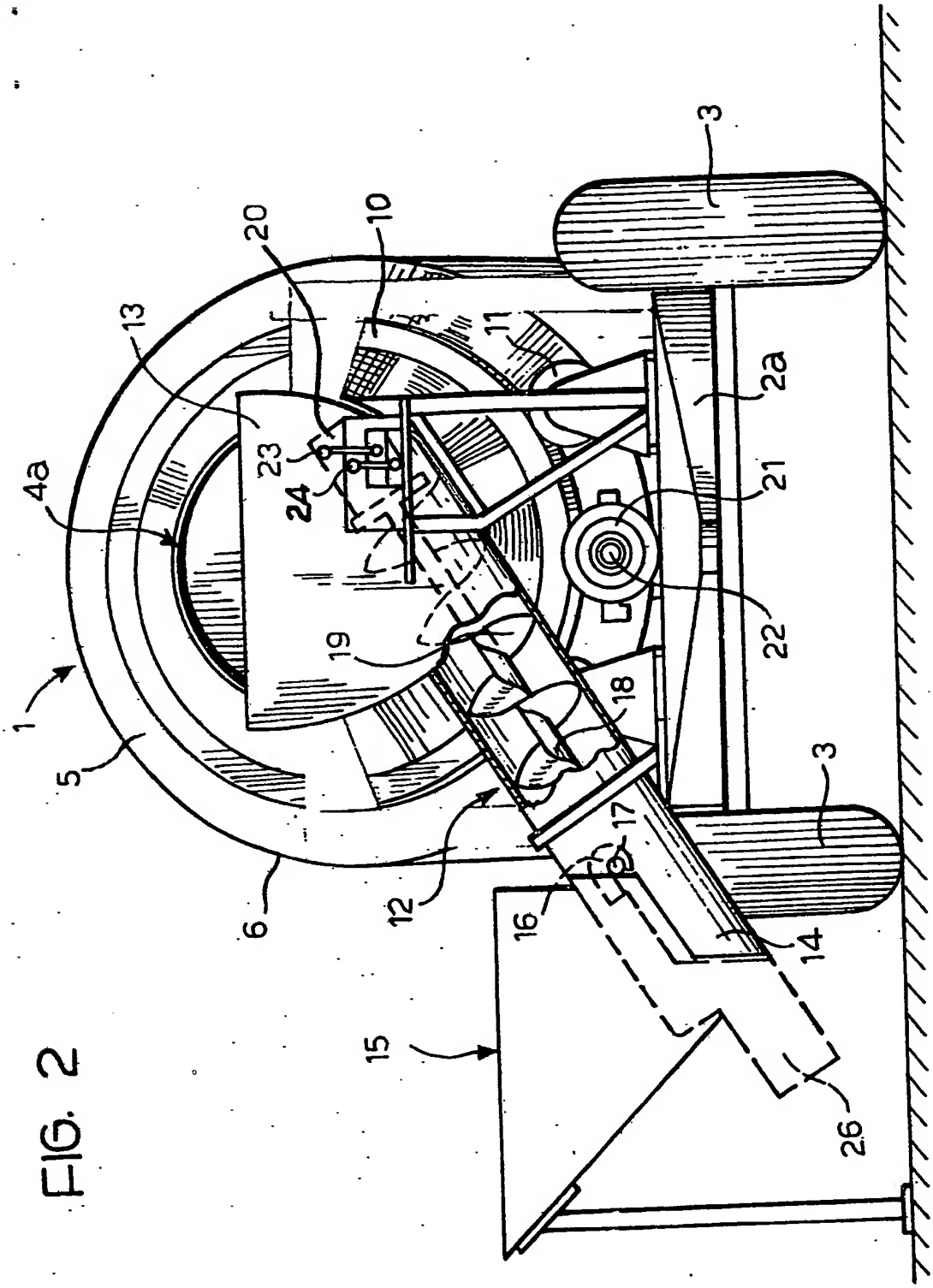


FIG. 2

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FIG. 3

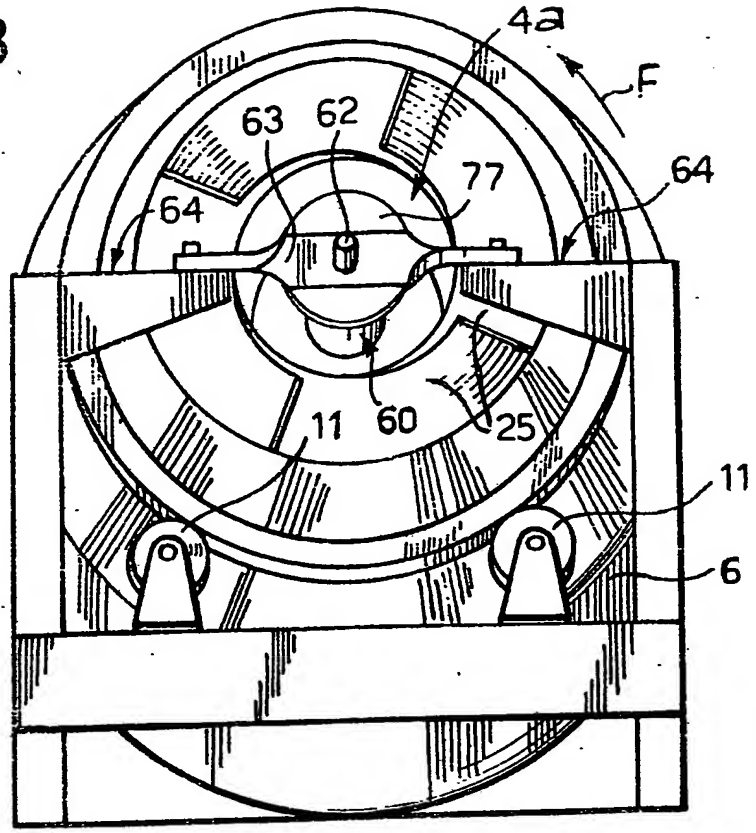



FIG. 4

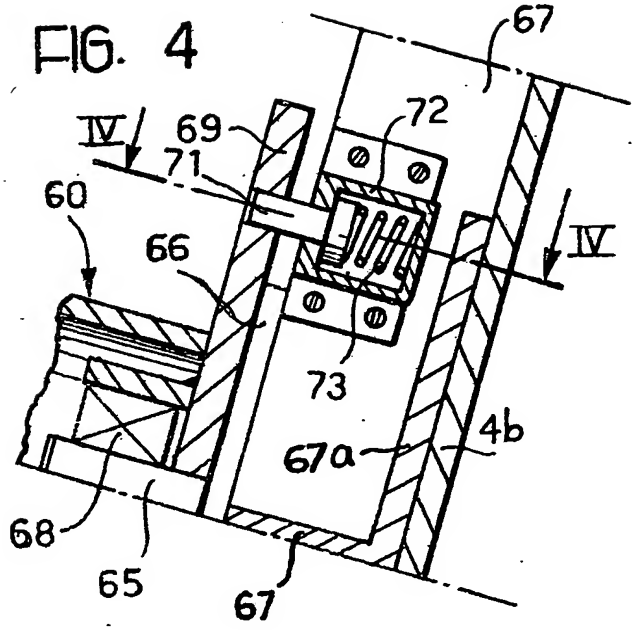
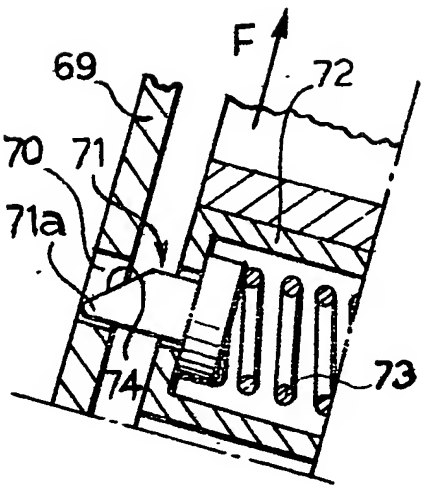



FIG. 5



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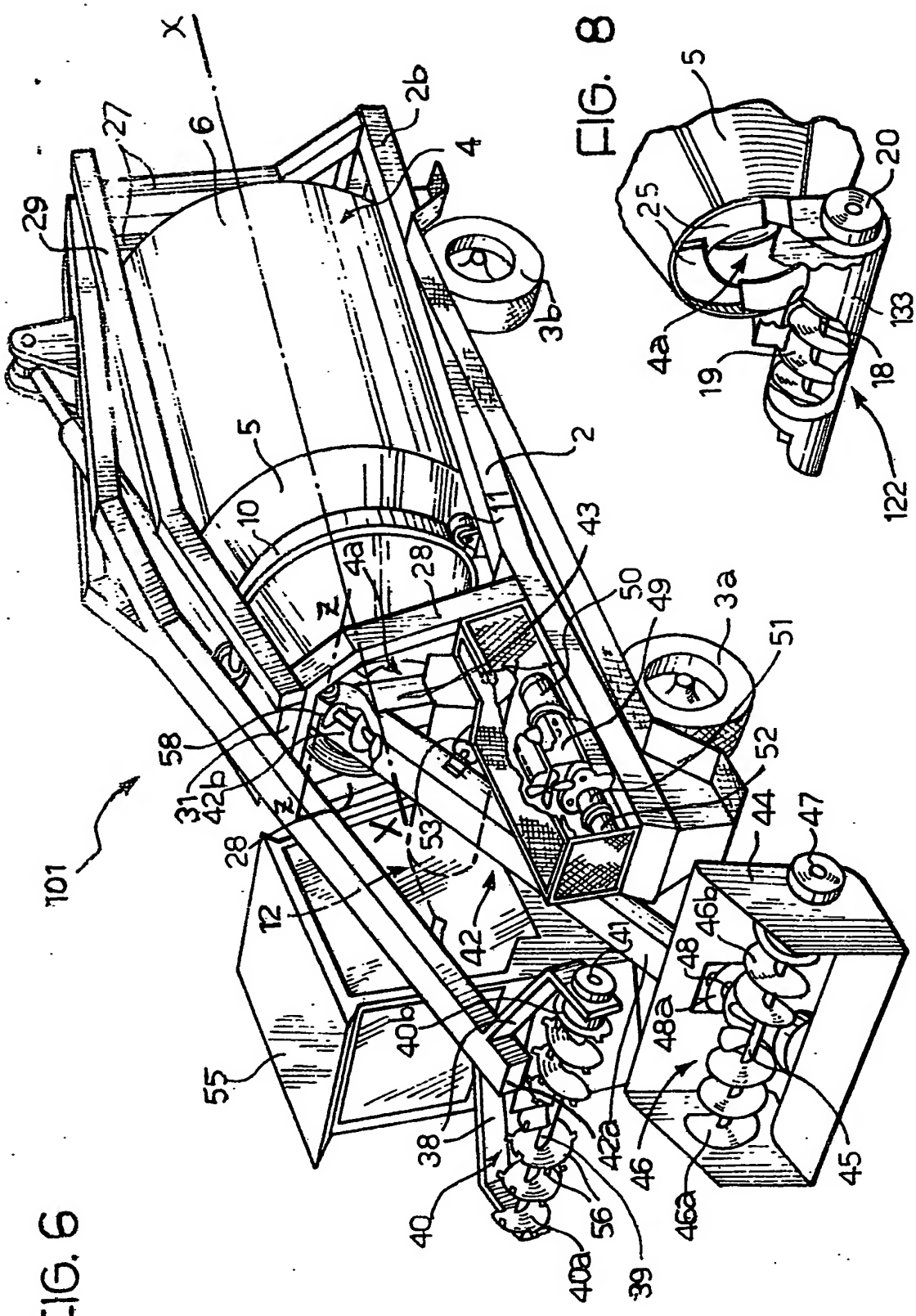


FIG. 6




FIG. 8

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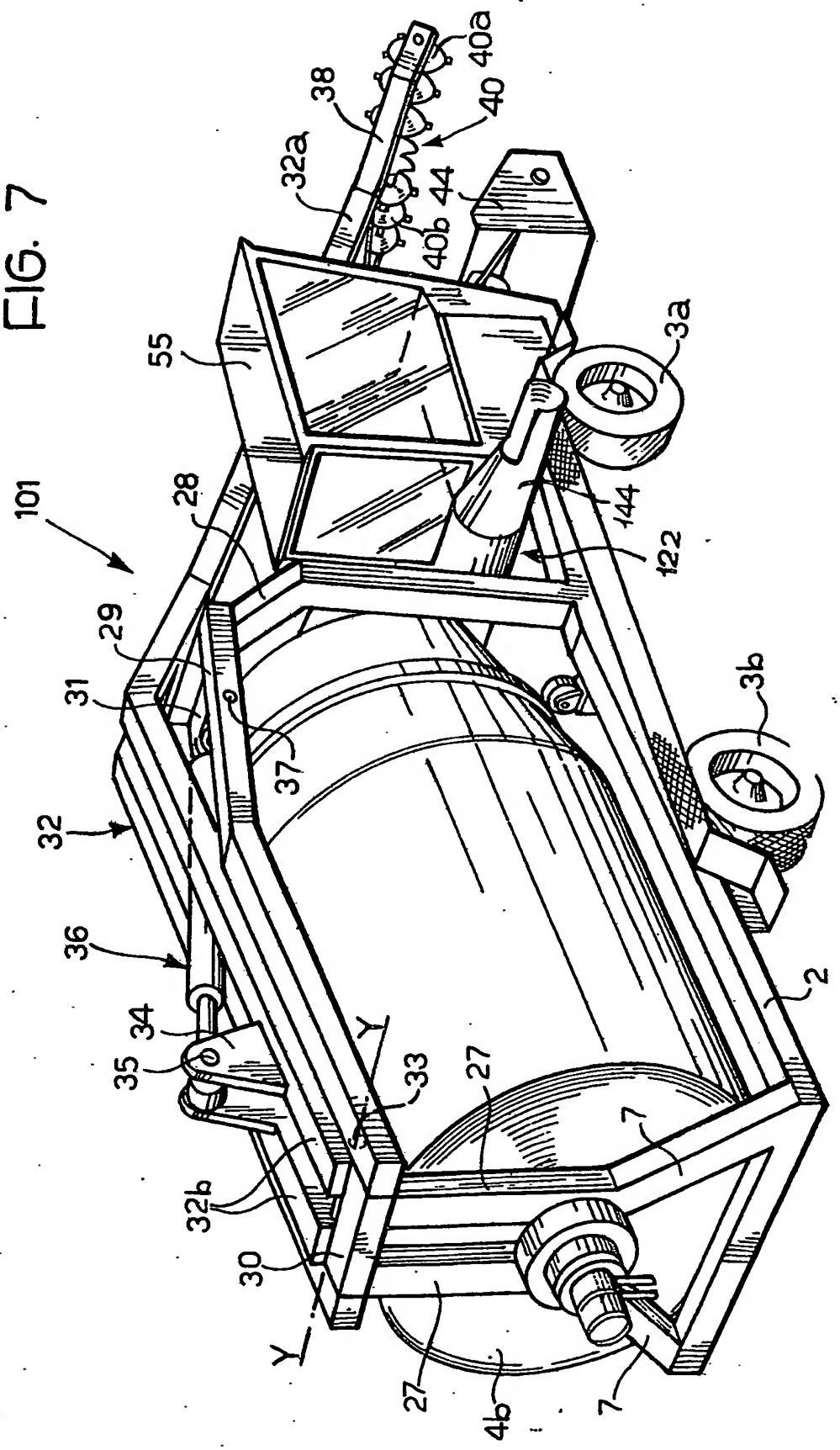
FIG. 7



SPECIFICATION

# A MACHINE FOR MIXING AND DISTRIBUTING LOOSE MATERIALS, SUCH AS ANIMAL FEEDSTUFFS

The present invention relates to a machine for mixing and distributing loose materials such as animal feedstuffs, in the form of fodder, forage or other products intended for feeding to animals, particularly cattle.

When feeding cattle intensively it is necessary, in order to be able to provide the cattle with a complete and balanced diet to be able to prepare them a composite feed substance made up from a variety of different ingredients. This is normally obtained by mixing together in a mill all the different feed substances such as industrially obtained fodder, forage, for example maize, and all the other various natural products used in the feeding of cattle. The mixed feed is then distributed to the various farms and other users. For larger scale users, however, it is uneconomic to be reliant on a mill for feedstuffs, particularly if the concern is able to produce large quantities of some of the ingredients, and the present invention provides a machine by which a mixed animal feed can be prepared from a variety of basic ingredients, whether stored in dumps or silos. The technical problem which the present invention seeks to solve, therefore, is that of gathering the various feed ingredients from a plurality of different stores thereof, mixing the ingredients together and distributing the composite feedstuffs so produced, with the object of obtaining a homogenous final product provided with all the characteristic elements necessary for a correct and organic feeding of cattle.

This technical problem is solved by the present invention with a machine by means of which complete and uniform mixing of the different ingredients to be used in a composite feedstuff can be effected, and, moreover, which can with ease and continuity effect distribution of the final product so obtained.

According to the present invention, there is provided a machine for mixing and distributing loose materials such as animal feedstuffs in the form of fodder, forage or other products intended for feeding to animals, comprising a support frame provided with wheels for the transport of the machine, a mixing container rotatable about an axis lying in a vertical plane generally parallel to the length of the machine, one end of the container being closed by a transverse wall and the other end of the container having an opening serving as the entrance and exit mouth thereof, a plurality of projections extending inwardly from the inner surface of the container and inclined helically with respect to the axis of the container, feed means for conveying material to be mixed into the container, discharge means for conveying material from the container after mixing has taken place, first drive means for driving the feed means and the discharge means, and second drive means for causing the container to rotate selectively in one or other directional sense about the axis thereof.

Two embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a side view of a machine formed as a first embodiment of the invention;

Figure 2 is a front view of the machine illustrated in Figure 1;

Figure 3 is a schematic and partial end view on the line III—III of Figure 1;

Figure 4 is an axial sectional view, on a larger scale, of a detail of the embodiment of Figure 1;

Figure 5 is a sectional view taken on the line V—V of Figure 4;

Figure 6 is a front perspective view of a second embodiment of the invention;

Figure 7 is a rear perspective view of the machine of Figure 6; and

Figure 8 is a view on a larger scale of a detail of the embodiment of Figure 6.

Referring now to the drawings, and particularly to Figures 1 to 5, there is shown a machine 1 for mixing and distributing loose materials such as animal feedstuffs in the form of fodder, forage or other products for feeding animals, particularly for feeding cattle. The machine 1 includes a support frame 2 carried on a pair of wheels 3. The frame 2 has a forward portion 2*a* bearing a ring 50 by means of which the machine 1 can be drawn by a towing vehicle.

The frame 2 supports a mixing container 4 the main body part 6 of which is cylindrical and which has a conical front part 5 the wider end of which is joined coaxially to the cylindrical rear part 6. The smaller end of the conical front part 5 of the container 4 has an opening 4*a* which faces forwardly and forms the entrance and exit mouth of the container 4. The rear end of the cylindrical main body part 6 is closed by a transverse end wall 4*b* which forms the bottom of the container 4. The axis of the container 4 is indicated X—X; this axis lies in a vertical plane substantially parallel to the length of the machine which, in this embodiment, is parallel to the rolling direction of the wheels 3. In other embodiments, not shown, however, the length of the machine may be transverse the rolling direction of the wheels. The axis X—X of the container 4, moreover, is inclined to the horizontal, sloping down rearwardly, and forms an angle of about 8° respect to the general plane of the frame 2, which in conditions of normal operation of the machine on a horizontal surface, would itself be horizontal and parallel to the surface.

The front conical part 5 of the container 4 has an annular reinforcement ring 10 midway along its length, the radially outer surface of which constitutes a track engaged by a pair of rollers 11 rotatably supported by the frame 2 as can be seen in Figure 3. Rigidly connected to the rear wall 4*b* of the cylindrical main body part 6 of the container 4 is a pin 6*a* extending coaxially rearwardly through a bearing 8 which is carried by a pair of

inclined arms 7 of the support frame 2. The container 4 can thus turn about its own axis X—X with respect to the frame 2. The pin 6*a* is connected to a motor 9 of the hydraulic type which drives the pin 6*a* to rotate and therefore rotates the container 4 about its axis.

In front of the container 4 extends a cylindrical duct 12 which extends transversely with respect to the axis X—X of the container 4 and is inclined downwardly from an enlarged end 13 which is positioned adjacent the entrance and exit mouth 4*a* of the container to a discharge end 14 which projects laterally to one side of the machine. Carried on the lower end 14 of the duct 12 is a hopper 15 which is hooked on to the duct by a pair of hooks 16 engaged over coaxial transverse spigots 17 which project laterally out from the duct 12 to which they are rigidly fixed. Within the duct 12 is mounted, coaxially, a shaft 18 on which is fixed a helically wound plate 19 which forms, together with the cylindrical duct 12, a screw conveyor device. To the upper end of the shaft 18 of this screw conveyor device, which is positioned adjacent the entrance and exit mouth 4*a* of the container 4, is fixed the output shaft of a hydraulic motor 20.

Beneath a screw conveyor device, and carried on the support frame 2 is a pump 21 having a drive shaft 22 which, in use, is connected to a motor unit, not illustrated. The pump 21 feeds hydraulic fluid under pressure to the hydraulic motors 9 and 20 to drive these to rotate. A suitable hydraulic circuit, including a pair of valves (not shown) controlled by respective knobs 23, 24 is provided for control of the motors 9 and 20 independently whereby to cause rotation of the container 4 or of the screw conveyor lodged in the duct 12 as required.

Within the container 4, joined rigidly to the inside surface thereof and extending towards the inside of the container are helical guides formed by helically turned thin steel plates 25. The presence of these helical guides facilitates the mixing of the material contained in the container 4 and, in dependance on the direction of rotation of the container 4, causes axial displacement of the material inside the container in one direction or the other. In the conical part 5, there are four elements constituting the helical guides whilst in the cylindrical part 6 there are only two such guides, although each of these is wound through two turns, whilst in the conical portion the four helical guides only make one turn each. All these helical guides are wound in a right handed sense.

Extending through the interior of the container 4, and coaxially therewith, is a shaft 60 which is free to rotate with respect to the container about the axis thereof. The shaft 60 is supported at one end on the rear wall 4*b* of the container and the other end passes through the entrance mouth 4*a* of this latter. The shaft 60 carries a helically wound steel strip 61 extending for the entire length of the cylindrical part 6*a* of the container. The helix 61 is also wound in a right handed sense. The forward end of the shaft 60 is provided with a coaxial pin 62 which engages rotatably in a shaped plate 63. The plate 63 is supported at the ends of two cross pieces 64 projecting inwardly from uprights of the support structure 2 as can best be seen in Figure 3.

The rear end of the shaft 60 is rotatably supported within the container, and spaced slightly from the rear wall 4*b* of the container 4 by means of a coaxial pin 65 rigidly connected to a plate 66 which is fixed in relation to the rear wall 4*b* of the container by radially extending reinforcement ribs 67, themselves fixed to a stiffening plate 67*a* and to the rear wall 4*b*. The rearward end of the coaxial shaft 60 is carried on the said pin 65 by a bearing 68, and is provided on its end face with a radial plate 69 which is secured thereto.

The plate 69 is provided with a hole 70 (Figure 5) into which engages the free end 71*a* of a latch pin 71. The latch pin 71 is slidable in a support and guide device 72 carried on one of the radial ribs 67. Within the support device 72 is a spring 73 which urges the latch pin 71 towards the plate 69. The free end 71*a* of the latch pin 71 has an inclined face 74 the inclination of which is such that when the container 4 rotates in an anti-clockwise sense as indicated by the arrow F of Figure 3, the latch 71 is thrust back against the action of the spring 73 by contact with the wall of the hole 70 facing the inclined face 74, and consequently the latch pin 71 is disengaged from the plate 69 and the shaft 60 is not drawn to rotate with the container 4. When, on the other hand, the container rotates clockwise as viewed in Figure 3, that is in a sense opposite the arrow F, the latch pin 71 engages in the plate 69 and thus the shaft 60 is interconnected to rotate rigidly with the container 4.

The shaped plate 63, carried by the crosspiece 65 of the support structure 2, is located adjacent the entrance and exit mouth 4*a* of the container 4 and is itself provided with a support and guide device 75 similar to the device 72. The device 75 carries a slidable latch pin 76 similar to the pin 71, which engages, in a manner entirely analogous with this latter, into a plate indicated 77 rigidly connected to the adjacent end of the shaft 60. The latch pin 76 has an inclined face so positioned that it engages the plate 77 to prevent rotation of the shaft 60 in the sense indicated by the arrow F: this, thus provides a suitable resistance to the rotation of the shaft 60 to ensure disengagement of the latch pin 71 at the rear end thereof so that when shaft 60 remains stationary, fixed to the frame 2, when the container 4 rotates in an anticlockwise sense as viewed in Figure 3. When on the other hand, the shaft rotates in the sense opposite the arrow F of Figure 3, the latch pin 76 is thrust back against the action of its biasing spring and allows the shaft 60 to turn, with the container 4, with respect to the frame 2.

In the conditions of use illustrated in Figures 1 and 2 the machine 1 is set for receiving loose material to be mixed and for transferring it into the interior of the container 4. This material, comprising, for example, fodder, forage or other feed products, is placed by the operator into the hopper 15. By operating the knobs 23 and 24 the

operator then causes the shaft 18 and the container 4 to rotate in such a way that the material in the hopper 15 is fed by the helix 19 up to the mouth 4*a* of the container 4. During this time the motor 9 drives the container 4 in the sense indicated by the arrow F of Figure 3 so that, as described above, the shaft 60 is held in a fixed position with respect to the frame by the latch 76.

With the container turning in this direction the action of the helices 25 is such as to convey the material lying in the bottom of the container 4 towards the rear wall 4*b* of the container 4 at the same time causing mixing. When the container 4 is half-full or more the material in contact with the stationary helix 61 is conveyed around this by the movement of the container 4 and is therefore further mixed and also urged towards the forward conical part 5 of the container 4. The rotation of the container 4 is continued in this direction until mixing is completed; then the operator, by acting on the knobs 23 and 24, reverses the drive direction of the motors 9 and 20 and thus reverses the movement of the container 4 and of the shaft 18 of the screw conveyor 12.

The container 4 now turns in a sense opposite to that of the arrow F of Figure 3 and the shaft 60 is therefore freed by the latch pin 76 as described above, and becomes engaged by the latch pin 71 so that the shaft 60 rotates rigidly with the container 4 in a clockwise sense as viewed in Figure 3, that is opposite to the direction indicated by the arrow F so that the helix 61 now cooperates with the helices 25 in conveying the material in the container 4 towards the mouth 4*a* from where it is discharged into the duct 12. The shaft 18 of the screw conveyor in the duct 12 conveys the mixed materials down the duct 12 and into the animal stalls or into feedstuff containers for the animals to eat from. To permit this distribution operation the hopper 15 is unhooked from the duct 12 and, if desired, a duct extension 26, shown in broken outline in Figure 2, can be hooked onto the duct in its place.

In Figures 6, 7 and 8 there is illustrated the second embodiment of the invention, which is a machine, generally indicated 101, similar to the machine illustrated in the preceding Figures. In the following description those component parts of the second embodiment which correspond to the same parts of the first embodiment will be indicated by the same reference numerals. The second embodiment differs from the first in as much as it is able to load materials into the container 4 collecting these from clamps or silos, without requiring the materials to be separately loaded into a hopper.

The machine 101 includes a support frame 2 carried on a pair of rear wheels 3*b* and a pair of front wheels 3*a*. The front wheels 3*a* are steering wheels and the rear wheels 3*b* are driven wheels. From the rear of the frame 2 extend upwardly two inclined arms 7 which carry, via a support structure similar to that of the embodiment of Figures 1 to 4, a container 4 having a cylindrical main body part 6 and a conical front part 5 with a mouth 4*a* through which material can be fed into the container 4 and discharged from it.

As can be seen in Figure 8, against the lower part of the mouth 4*a* is disposed one end 133 of a discharge duct 122 the other end 144 of which projects out to one side of the machine 101. Within the duct 122 and coaxial with it is mounted a shaft 18 carrying a helically wound strip 19 forming a screw conveyor. The shaft 18 is driven to rotate by a hydraulic motor 20. The container 4, as in the first embodiment, is driven to rotate by the hydraulic motor 9. Likewise, as in the first embodiment, the interior of the container 4 has the same arrangement of helical guides 25 for displacing and mixing the material within the container itself, and the same coaxial shaft arrangement operating in the same way.

Over the container 4 extends a double arch structure constituted by a pair of upright rear supports 27 projecting upwardly from the inclined supports 7, and a pair of front supports 28 connected to the rear supports by a pair of longitudinal beams 29. This arch structure is reinforced transversely by two cross pieces 30 and 31 located respectively at the positions of the supports 27 and 28. Between the two longitudinal beams 29 extends a pivoted arm 32 the rear end 32*b* of which is pivoted to the cross piece 30 about a horizontal axis Y—Y perpendicular to the longitudinal axis of the machine. Upwardly from the pivoted arm 32, adjacent its rear end 32*b*, project a pair of lugs 34 which support a pivot pin 35 which lies parallel to the axis Y—Y. To the pin 35 is pivoted the end of the arm of a hydraulic ram 36, the end of the cylinder of which is pivotally connected, by means of a pin 37, itself parallel to the axis Y—Y, to the forward end of the two longitudinal beams 29. Extension and contraction of the hydraulic ram 36 thus causes raising and lowering of the arm 32.

At the forward end 32*a* of the arm 32 are two laterally extending arms 38 which carry, in a rotatable manner, a shaft 39 which extends perpendicular to the longitudinal axis of the machine 101. The shaft 39 carries a cutter 40 in the form of two oppositely wound helical parts 40*a* and 40*b* which extend respectively to either side from the middle of the shaft 39. The shaft 39 is driven to rotate by means of a hydraulic motor 41 carried on one of the arms 38.

Beneath the main arm 32 there is a feed duct housing a screw conveyor for conveying material into the container 4. The duct 42 is disposed with its axis lying in a vertical plane parallel to the length of the machine. The duct 42 is carried at its rear end 42*b* by the front uprights 28 of the arch structure, just below the front crosspiece 31. This rear end 42*b* is, in fact, pivoted about an axis Z—Z parallel to the axis Y—Y about which the arm 32 is pivoted. The rear end 42*b* of the duct 42 opens into the upper part of the mouth 4*a* of the container 4 and is provided with an extension piece 43, which projects downwardly into the container 4 to form an auxiliary discharge duct through which material conveyed up the duct 42 is discharged into the

container 4.

The forward end 42*a* of the duct 42 carries, rigidly mounted thereto, a hopper 44 within which there is a screw conveyor comprising a rotary shaft 45 extending perpendicular to the axis of the duct 42 on which is fixed a helically wound steel strip 46, in two separate parts 46*a* and 46*b* which extend from the middle of the shaft 45 towards its ends and are oppositely wound with respect to one another. The shaft 45 is driven to rotate by a hydraulic motor 47 carried on the hopper. The screw conveyor within the duct 42 is formed by a coaxial shaft 48 provided with a helically wound strip 48*a*. The shaft 48 is driven to rotate by a hydraulic motor 58 connected to the upper rearward end of the shaft. The angular position of the duct 42 about the axis Z—Z is controllable by the operator by means of a hydraulic ram 53 connected at one end to the duct 42 and at the other end to the support frame 2.

The rear driving wheels 3*b* are driven by a hydraulic motor *via* a differential gear unit (not shown). The steering of the front wheels 3*a* is obtained by hydraulic means with a system of the type known as "hydro guide".

The motive power required for driving the machine 101 and, moreover, for effecting movement of the various component parts of the machine is provided by a diesel motor unit 49 which provides a drive for the hydraulic pumps 50, 51 and 52. These hydraulic pumps feed fluid under pressure to the various hydraulic motors described above as well as to the hydraulic rams 36 and 53, when controlled to do so by operation of the valves (not shown) of the hydraulic circuit, whereby to control the raising and lowering of the arm 32 and of the duct 42. A control panel on which control levers for these valves are mounted is installed in a control cab 55 for the operator.

The operation of the machine described above is as follows:

The operator drives to a suitable position in front of a silo or other store containing one of the materials intended to be mixed to provide the feedstuff required. Then, by operating on the hydraulic ram 53 controlling the pivoted arm 32 causes this to perform a sweep down the exposed face of the material in the store. At the same time the shaft 39 and therefore also the helically wound strip 40 is caused to rotate. The position of the machine is then adjusted, if necessary, so that the helix 40 is carried into contact with the material contained in the store and in this way it operates as a rotary milling cutter material from the main body of material in the store. For this purpose the peripheral surface of the helically wound strip 40 has a plurality of projections in the form of cutting blades 56. The action of these blades 56 is to form a neat cut in the exposed face of the material in the store without causing the material to be broken up. During this cutting operation, the operator controls the position of the feed duct 42 in such a way that the hopper 44 is located in a position immediately under the helical cutter 40 to receive material cut from the store thereby. This material therefore falls into the hopper 44 and is fed by the two opposite helical conveyor screw parts 46*a* and 46*b* towards the central position of the hopper itself, the direction of rotation of the shaft 49 being such that the screw conveyor parts 46*a* and 46*b* convey the material towards the centre of the hopper 44.

From the hopper 44 the material is drawn by the helix 48*a* into the interior of the duct 42 along which it is conveyed until it is discharged into the mouth 4*a* of the container 4. Again the shaft 48 rotates in the appropriate direction so that the helix 48*a* transports the material up the duct 42 to the container 4. During this infeeding stage it is necessary that the rotation of the container 4 is in a sense such that the helical guides cause displacement of the material towards the rear of the container itself. When the required amount of this material has been fed into the container 4 the machine is driven to other stores or other materials and the process repeated until all the required ingredients have been collected and mixed thoroughly together.

After this the operator drives the machine 101 to wherever the mixed materials are to be deposited and then reverses the rotation of the container 4 to cause it to expel the mixed material contained in it, which material is therefore transferred into the duct 122. The duct 122 in this embodiment operates solely as a discharge duct and therefore the shaft 18 contained need only rotate in the direction corresponding to the displacement of the mixed materials from the mouth 4*a* of the container 4 towards the outlet end 144 of the duct 122 itself.

In this second embodiment, therefore, intake of material is effected solely by the duct 42 whilst discharge of material is carried out solely by the duct 122. As distinct from the machine 1 illustrated in Figures 1 to 5, the machine 101 of Figures 6, 7 and 8 is able to move locomotively, being provided with steering and driving wheels and motors by which the machine is able to move without requiring a tractor vehicle as does the embodiment of Figures 1 to 5. Moreover, the machine 101 is provided with means for effecting automatic removal of material from a store thereof to be fed into the machine. Such removal of material from the store is effected, moreover, in such a way as to avoid disturbing the remaining material in the store which is not picked up. This is important since such disturbance would lead to the admission of air to the compacted material resulting in a secondary fermentation which would cause deterioration of its feed value.

## CLAIMS

1. A machine for mixing and distributing loose materials such as animal feedstuffs in the form of fodder, forage or other products intended for feeding to animals, comprising a support frame provided with wheels for the transport of the machine, a mixing container rotatable about an axis lying in a vertical plane generally parallel to the length of the machine, one end of the

container being closed by a transverse wall and the other end of the container having an opening serving as the entrance and exit mouth thereof, a plurality of projections extending inwardly from the inner surface of the container and inclined helically with respect to the axis of the container, feed means for conveying material to be mixed into the container, discharge means for conveying material from the container after mixing has taken place, first drive means for driving the feed means and the discharge means, and second drive means for causing the container to rotate selectively in one or other directional sense about the axis thereof.

2. A machine as claimed in Claim 1, in which the mixing container comprises a main body part of substantially cylindrical shape closed at one end by the said transverse wall and open at the other, and a frusto-conical part coaxial with the cylindrical main body part and the wider end of which is connected to the said other end of the main body part whilst the smaller end has an opening constituting the said entrance and exit mouth of the container, the axis of the container being inclined downwardly from front to rear, with respect to the horizontal, by an angle not greater than 30° when the machine is in a normal position for use on a horizontal surface.

3. A machine as claimed in Claim 2, including a duct housing a conveyor device constituting both the said feed means and the said discharge means, one end of the duct being located in a position adjacent the lower part of the exit and entrance mouth of the container and the opposite end of the duct projecting to one side of the machine.

4. A machine as claimed in Claim 3, in which the said conveyor device in the duct is a screw conveyor and in which the first drive means comprise a single motor operable to drive the screw conveyor selectively in one or other direction of rotation.

5. A machine as claimed in Claim 3 or Claim 4, including a feed hopper provided with attachment means for releasably attaching it to the duct at the end thereof which projects from the side of the machine.

6. A machine as claimed in Claim 1 or Claim 2, in which the feed means comprises a feed duct located with its axis lying in a vertical plane substantially parallel to the axis of the container and one end pivoted to the frame of the machine about a horizontal axis perpendicular to the axis of the container and located adjacent the container, a screw conveyor housed coaxially within the duct, the other end of the duct carrying a feed hopper housing a screw conveyor extending transversely with respect to the axis of the duct, and a device for controlling the position of the feed duct about the pivoted end thereof.

7. A machine as claimed in Claim 6, including cutter means for removing material from a store thereof, the cutter means being positioned above the said feed hopper.

8. A machine as claimed in Claim 6 or Claim 7, in which the discharge means comprises a duct housing a screw conveyor located with one end in a position adjacent the lower part of the entrance and exit mouth of the container and the opposite end projecting laterally from the machine.

9. A machine as claimed in Claim 7 or Claim 8, in which the cutter means for removing material from a store is a rotary milling cutter carried by an arm pivoted about a horizontal axis perpendicular to the length of the machine, there being provided means for controlling the turning movement of the pivoted arm.

10. A machine as claimed in any preceding claim, in which the mixing container houses a coaxial shaft free to rotate with respect to the container itself, the said coaxial shaft carrying at least one helical guide element and having control means acting thereon to cause relative rotation between the coaxial shaft and the container when the container rotates in one directional sense, and to permit the shaft to rotate with the container when the latter rotates in the other directional sense, the said helical guide element being such that when the container turns in the said one directional sense material within the container and in contact with the said helical guide element is displaced towards the mouth of the container.

11. A machine as claimed in Claim 10, in which the helical projections on the inner surface of the container and the helical guide element on the coaxial shaft have the same hand, such that when the container rotates in the said one direction of rotation material in contact with the helical projections on the inner surface of the container is displaced away from the mouth thereof.

12. A machine as claimed in Claim 10 or Claim 11, in which the control means acting on the coaxial shaft includes a stop device operable to fix the shaft non-rotatably with respect to the frame of the machine when the container rotates in the said one direction.

13. A machine as claimed in Claim 12, in which the control means includes a coupling device which rigidly connects the coaxial shaft with the container for rotation therewith when the container rotates in the said other direction.

14. A machine as claimed in Claim 12 or Claim 13, in which the stop device comprises a latch pin carried by a support fixed to the frame of the machine and engageable into an opening in a cooperating member rigidly connected to the coaxial shaft, the latch pin or the opening in the cooperating member having an inclined face the direction of inclination of which is such that the latch pin is urged by wedge action out of the said opening when the container turns in the said other direction, resilient biasing means urging the latch pin towards the said cooperating member for engagement in the said opening when the container rotates in the said one direction.

15. A machine as claimed in Claim 13 or Claim 14, in which the said coupling device comprises a latch pin carried by a support fixed to the container, the free end of the latch pin being engageable into an opening in a cooperating member rigidly connected to the coaxial shaft, the

latch pin or the opening in the cooperating member having an inclined face the direction of inclination of which is such that the latch pin is urged by wedge action out of engagement with the said opening when the container turns in the said one direction, resilient biasing means urging the latch pin towards the said cooperating member for engagement in the opening therein when the container rotates in the said other direction.

16. A machine as claimed in Claim 15, in which the helical guide element on the coaxial shaft extends for substantially the whole axial length of the cylindrical main body part of the container.

17. A machine for mixing and distributing loose materials such as animal feedstuffs in the form of fodder, forage or other products intended for feeding to animals, substantially as hereinbefore described with reference to, and as shown in, Figures 1 to 5 or Figures 6 to 8 of the accompanying drawings.

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